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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,659	12/07/2001	Allan D. Jepson	A1459	3907
28014	7590	11/30/2004	EXAMINER	
BEVER, HOFFMAN & HARMS, LLP			LU, TOM Y	
1432 CONCANNON BLVD			ART UNIT	
BLDG G			PAPER NUMBER	
LIVERMORE, CA 64550-6006			2621	

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/016,659	JEPSON ET AL.	
	Examiner	Art Unit	
	Tom Y Lu	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. The attempt to incorporate subject matter into this application by reference to Non-patent literatures is improper because:

- a. A disclosure in an application, to be complete, must contain such description and details as to enable any person skilled in the art or science to which the invention pertains to make and use the invention as of its filing date. In re Glass, 492 F.2d 1228, 181 USPQ 31 (CCPA 1974). While the prior art setting may be mentioned in general terms, the essential novelty, the essence of the invention, must be described in such details, including proportions and techniques, where necessary, as to enable those persons skilled in the art to make and utilize the invention.
- b. An application as filed must be complete in itself in order to comply with 35 U.S.C. 112. Material nevertheless may be incorporated by reference, Ex parte Schwarze, 151 USPQ 426 (Bd. App. 1966). An application for a patent when filed may incorporate "essential material" by reference to (1) a U.S. patent, (2) a U.S. patent application publication, or (3) a pending U.S. application, subject to the conditions set forth below. "Essential material" is defined as that which is necessary to (1) describe the claimed invention, (2) provide an enabling disclosure of the claimed invention, or (3) describe the best mode (35 U.S.C. 112). In any application which is to issue as a U.S. patent, essential material **may not** be incorporated by reference to (1) patents or applications published by foreign countries or a regional patent office, (2) non-patent publications, (3) a U.S. patent or

application which itself incorporates "essential material" by reference, or (4) a foreign application. (See MPEP § 608.01(p)).

- 1) Applicant at the specification, page 22, describes the essential material related to "there are many properties of image appearance that one could use as data streams from which one could learn appearance models for tracking and object search. ... in this work, the data streams were derived from responses of a steerable filter pyramid is applied" by reference to "The design and Use of Steerable Filters".
- 2) Applicant at the specification, page 22, describes the essential material related to "... it provides the fidelity for accurate image alignment afforded by phased based methods" by reference to "Stability of Phase Information".
- 3) Applicant at the specification, page 23, describes the essential material related to "... other parameterized image warps, and other parameterized region representations could also be used" by reference to "Region-Based Tracking Using Affine Motion Models in Long Image Sequences".
- 4) Applicant at the specification, page 24, describes the essential material related to "... the expectation-maximization (EM) algorithm is used" by reference to "Mixture Models for Optical Flow Computation".
- 5) Applicant at the specification, page 28, describes the essential material related to "... the method... is used to detect local phase instabilities that occur with bandpass signals" by reference to "Stability of Phase Information".
- 6) Applicant at the specification, page 28, describes the essential material related to "... apply the EM algorithm with a coarse-to-fine strategy and deterministic

Art Unit: 2621

annealing in fitting the motion parameters..." by reference to "Mixture Models for Optical Flow Computation".

- 7) Applicant at the specification, page 29, describes the essential material related to "the spatial phase gradient for this interpolation is determined from the gradient of the filter responses at the nearest pixel to the desired location on the image pyramid sampling grid" by reference to "Phase-Based Disparity Measurement".

- c. Mere reference to another application, patent, or publication is not an incorporation of anything therein into the application containing such reference for the purpose of the disclosure required by 35 U.S.C. 112, first paragraph. In re de Seversky, 474 F.2d 671, 177 USPQ 144 (CCPA 1973). Inasmuch as the referenced material in applicant's specification is essential to the invention and the provisions of MPEP § 608.01(p) have not been complied with, applicant's disclosure is incomplete.

Claim Rejections - 35 USC § 112

2. Claim 20 recites the limitation "third mixing probability" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2621

3. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Fleet et al ("A Framework for Modeling Appearance Change in Image Sequences", Computer Vision, 1998. Sixth International Conference on, 4-7 Jan. 1998).

a. Referring to Claim 1, Fleet discloses receiving an image datum corresponding to a most current image frame of the plurality of sequential image frames (page 666, left column, lines 7-8, see figure 11); determining a first likelihood value for the stable component and a second likelihood value for the transient component, the first likelihood value indicating a relative consistency between the image datum and the first data parameter, the second likelihood value indicating a relative consistency between the image datum and the second data parameter (the first likelihood value for the stable component, iconic model, is the log likelihood value of equation 9, at page 663, when the parameters of iconic change $\vec{\alpha}_4 = \vec{\sigma}$, and the first mixing probability is

$$p_i(I_i(\vec{x}, t) | \vec{\alpha}_i, \sigma_i) = \frac{2\sigma^3}{\pi(\sigma^2 + (I(\vec{x}, t) - I_c(\vec{x}, t; \vec{\sigma}_i))^2)^2} \text{ at page 662 for iconic model; and}$$

the second likelihood value for the transient component, deformation component, is the log likelihood value of equation 9 when the parameters of iconic change $\vec{\alpha}_1 = \vec{m}$, and the

$$\text{second mixing probability is } p_i(I_i(\vec{x}, t) | \vec{\alpha}_i, \sigma_i) = \frac{2\sigma^3}{\pi(\sigma^2 + (I(\vec{x}, t) - I_c(\vec{x}, t; \vec{\sigma}_i))^2)^2} \text{ for}$$

deformation component; Note iconic model indicates the relative consistency of "iconic change"; and the deformation component indicates the relative consistency of "brightness", see pages 664-666, sections 6-6.3); and updating the first mixing probability of the stable component and the second mixing probability of the transient

component using the first and second likelihood values, respectively (Fleet at section 4 EM-Algorithm, page, 663, right column, teaches the mixing probability, of the components are continuously updated as to optimize the performance of models).

b. Referring to Claim 2, Fleet discloses further comprising filtering the image datum before determining the first and second likelihood values (page 664, left column, line 18, “a three level pyramid in the “coarse-to-fine estimation” performs “filtering”).

c. Referring to Claim 3, Fleet discloses wherein the filtering is performed using a steerable pyramid (the “coarse-to-fine estimation” incorporates “a three level pyramid”, which is a steerable pyramid, page 664, left column, lines 17-18).

d. Referring to Claim 4, Fleet discloses wherein determining the likelihood comprises comparing the first data parameter with the image datum (see equation 9, $I(\vec{x}, t) - I_{c_i}(\vec{x}, t; \vec{\sigma}_i), \sigma_i$).

e. Referring to Claim 5, Fleet discloses updating said first data parameter and said second data parameter after updating said first and second mixing probabilities (as the parameters for deformation and iconic change vary from frame to frame, the first and second mixing probabilities updated accordingly).

f. Referring to Claim 6, Fleet discloses resetting said first and second mixing probabilities when said first mixing probability falls bellow a preset minimum value (for every object tracking algorithm, when a subsequent image frame is identical to the preceding image frame, or when the movement is negligible to the computer, pixels of the tracking object in the subsequent image frame takes the pixel value of the preceding

image frame. For example, the preset minimum value can be residual error zero, which means no movement at all between two image frames).

g. Referring to Claim 7, Fleet discloses setting the first data parameter to be the image datum value when the first mixing probability is reset (see explanation in Claim 6).

h. Referring to Claim 8, Fleet discloses receiving a current image frame including image datum associated with the target object (see figure 11, the target object is the human mouth area); estimating a motion of the target object using an adaptive appearance model (page 665, right column, line 26, "model appearance change") including a first image component having parameters defined by image data received over a relatively large number of image frames temporally preceding the current image frame, and a second image component having parameters defined by image data over the relatively small number of said sequential image frames temporally preceding the current image frame (with regard to the first and second components, see explanation in Claim 1 for "stable component" and "transient component"); and updating the first and second image components (page 663, right column, the mixing probability of the components are continuously updated as to optimized the performance of models)

i. Referring to Claim 9, Fleet discloses filtering said current image frame using a wavelet-based filter before estimating motion ("a three-level pyramid" filter is a wavelet based filter).

j. Referring to Claim 10, Fleet discloses wherein the parameters of the first components include a first data parameter and a first contribution parameter, wherein the parameters of the second components include a second data parameter and a second

contribution parameter, and wherein updating the first and second components comprises: comparing the image datum of the current image frame with the first data parameter of the first component, and recalculating the first and second contribution parameters based upon a difference between the first data parameter and the image datum (the first data parameter is Ic_4 and the second data parameter is Ic_1 ; and the first distribution parameter is the first likelihood value as explained in Claim 1, and the second distribution parameter is the second likelihood value as explain in Claim 1; and the first and second contribution parameters based on the difference between $I(\vec{x}, t) - Ic_i(\vec{x}, t, \vec{\sigma}_i)$, as the parameters $\vec{\sigma}_i$ changes from frame to frame).

k. Referring to Claim 11, Fleet discloses wherein the first contribution parameter comprises a mean value and a variance value calculated from a plurality of image data received in said relatively large number of image frames temporally preceding the current image, and wherein comparing comprises determining a likelihood value determined by a difference between the image datum and the mean and variance values (see equation 9, $I(\vec{x}, t) - Ic_i(\vec{x}, t; \vec{\sigma}_i), \sigma_i$ is mean, and σ_i is variance)

l. Referring to Claim 12, Fleet discloses calculating a first ownership probability for the first component using the likelihood value (see equation 7, page 663).

m. Referring to Claim 13, Fleet discloses comprising recalculating the mean and variance values using the likelihood value (page 663, right column, lines 20-39).

n. With regard to Claim 14, see explanation in Claim 8.

o. With regard to Claim 15, see explanation in Claim 10.

p. With regard to Claim 16, see explanation in Claim 11.

Art Unit: 2621

- q. With regard to Claim 17, see explanation in Claim 12.
- r. With regard to Claim 18, see explanation in Claim 13.
- s. With regard to Claim 19, see explanation in Claim 1 and 8, and a outlier component including a mixing probability that is determined by the occurrence of outliers in the image data received in the plurality of image frames (see section 4 EM-Algorithm for outlier layer with a fixed likelihood).
- t. With regard to Claim 20, Fleet discloses means for receiving a current image frame; and means for updating said first, second and third mixing probabilities in accordance with image received in the current image frame (Fleet discloses as parameters, which are based on image datum received from frame to frame, change, the probabilities are updated accordingly).

Conclusion

- 4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
 - a. Rosenberg et al, U.S. Patent No. 6,798,897 B1, see column 2.
 - b. Toklu et al, U.S. Patent No. 6,724,915 B1, see figure 1.
 - c. Toyama et al, U.S. Patent No. 6,741,756 B1, see figure 4.
- 5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Y Lu whose telephone number is (703) 306-4057. The examiner can normally be reached on 8:30AM-5PM.

Art Unit: 2621

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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